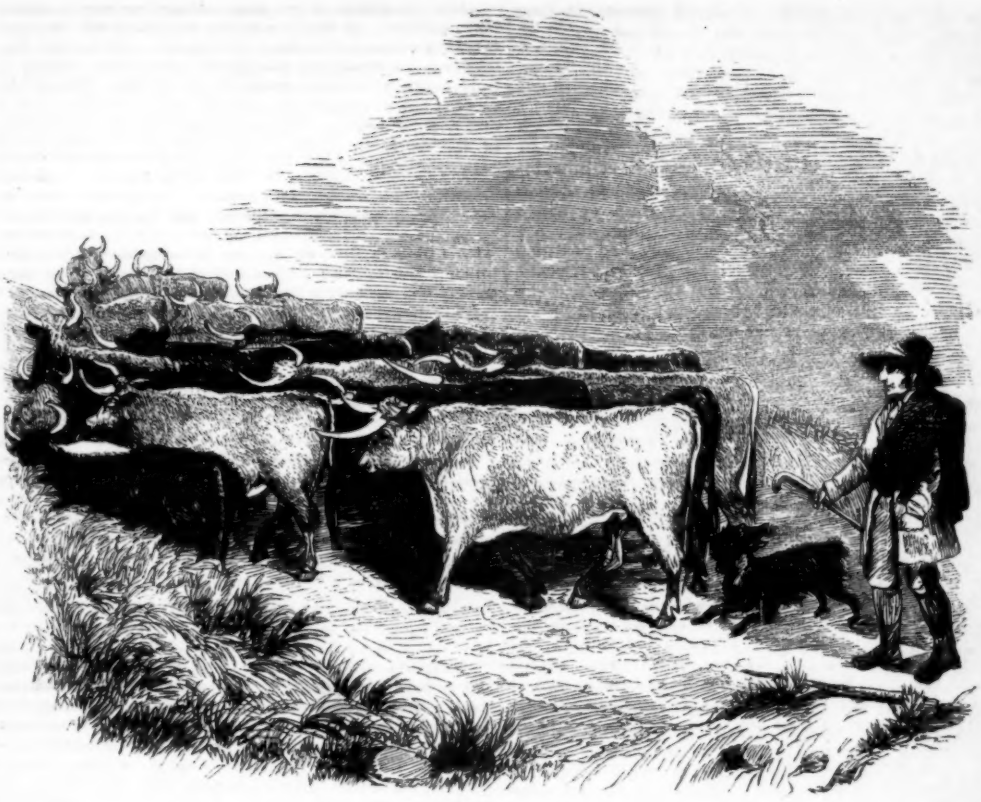

[English Cattle-Drover.]

CATTLE-DROVERS.

The industry required in producing the common food of the people, although simple and often rude in its nature, involves extensive and varied arrangements, and a division of employments nearly as striking as the complicated processes which excite so much admiration in manufactures. How varied are the contrasts between the different classes engaged in raising food and those who are employed in producing clothing and shelter, and yet the humblest services in each of these departments of industry are indispensable and invaluable. The subject of the cut leads us more immediately to the consideration of one of the useful occupations connected with the supply of animal food. The number of cattle in Great Britain is estimated at eight millions, and their value, at 10*l*. per head, amounts to the large sum of eighty millions sterling. One-fifth of the above-mentioned number, or 1,600,000, is annually consigned to the butcher. His are the last, except those of the cook, of a long chain of operations. London requires a supply of about 160,000 head of cattle annually, and by far the larger proportion are reared in the northern part of the island, though they are fattened in the south. The rich lands are more profitably employed than in supplying food to young beasts which are hardy enough to thrive on the coarse grasses of uncultivated wastes. Hence, as the most profitable distribution of the soil, lean cattle are the riches of a country which is not adapted to cultivation; but when required for the butcher, then the produce of the best soils may be advantageously employed in fattening them. In the districts where they are reared, the rent of the land is paid out of the profits of the live stock, for they are the chief wealth of the tenant, but in those where they are fattened rent is derived from a greater variety of sources, and the manure obtained from stall-feeding constitutes no inconsiderable proportion of the profit, for without this restorative the soil would soon become less productive. No plan therefore is so advantageous or economical as that under which the uncultivated lands are devoted to the rearing, and the richer soils to the fattening of stock. On their road from Scotland to the midland, eastern, and southern counties of England the services of a particular class of men is a distribution of labour equally convenient. The farmer of Norfolk need not leave his farm on a distant journey to the north, but purchases lean stock at the fairs in his own neighbourhood, to which the cattle are driven by those who make it their sole business. In the 'Survey of Dumbartonshire' there is an account of the progress of the cattle on their journey:—"The cattle bred in the West Highlands are, at the age of two years, or two years and a half, removed into Dumbartonshire and the neighbouring counties. At three years old they are carried to the northern counties of England, and so by degrees southward, enjoying at each remove a milder climate and a richer pasture than before, till they attain their full size, and reach the butcher in prime condition." The pastures on which they are supported before they commence their journey to the south are very coarse, and only cattle which have never known better fare can pick up a living upon them. After feeding here during the winter, they are sold in April or May, and it is evident that if they have sim-

ply not deteriorated during the severe season, they will, when that is over and there is the near prospect of abundant food from the summer pastures, fetch a higher price than was given for them before the winter with its possible scarcity. During summer they get into better condition, and are purchased by buyers from districts where turnips are cultivated, on which root and hay they are fed in the second winter. In spring they perhaps reach the rich pastures of Lincolnshire, Northamptonshire, or the marshes of Essex, and are put upon them for the early grass, on which they soon become fat. For stall-feeding, they are bought lean at the great autumn fairs and fattened during the winter. The prices vary in different years, but the proportions remain much the same, and the small Scotch cattle usually average per head, at fifteen months, 3*l.* to 4*l.*; at two years, 6*l.* or 7*l.*; at three or three and a half, 10*l.* or 12*l.* upwards. Every hand through which they pass derives a profit, as advantageous to the public interest as it is to his own.

The great trysts or fairs in Scotland for the sale of cattle exhibit the wealth of pastoral districts to great advantage. Those held at Falkirk are the largest, from its central situation, both for the breeders in the north and west of Scotland, and for the buyers for the English market. Every variety of cattle bred in Scotland, including those from the Western Islands and the Hebrides, are to be found at the Falkirk trysts, which are held on different days in the months of August, September, and October, the last being the largest, as the breeders must then dispose of all the stock which they do not intend to keep through the winter. At the October tryst there have been 50,000 cattle, 30,000 sheep, and 3000 horses on sale; and the number sold at the three together is about 80,000 cattle, 50,000 sheep, and 5000 horses, which fetch an aggregate sum of 650,000*l.*, averaging the cattle at 7*l.* each, the sheep at 18*s.*, and the horses at 10*l.* Some of the cattle are in good store condition, others are almost ready for the butcher, but the greater proportion are lean, and are purchased to be fattened in the south. Cattle-dealing partakes a good deal of the excitement of gambling, as the profits may be largely increased by the state of the markets, the supply of fodder, and many unforeseen contingencies; and they are enhanced also by adroitness and aptness in making bargains. A man who spends his whole life in attending fairs is, therefore, a character *sui generis;* but he has none of the low trickery of the horse-dealer.

From the great Scotch trysts the cattle are sent off to the south in droves of from two to three hundred, under the charge of a person called a 'topsman.' The following account of the further progress of the animals is from the treatise on 'Cattle,' in the 'Library of Useful Knowledge:'—"The topsman generally goes before, to see that grass is secured at proper stations, and to make all necessary arrangements. He has under him other drovers, in the proportion of one to about thirty cattle. The journey to Norfolk occupies about three weeks. The expense in summer and autumn is from 1*l.* to 1*l.* 4*s.* per head; and in winter, when they are fed with hay, they cost 10*s.* or 15*s.* per head additional. The cattle are purchased and paid for by the drovers, sometimes in cash, but more generally a part of the price is paid in bills, and sometimes the whole of it. In some instances, where the farmer has confidence in the drover, he consents that the purchase-money shall be remitted from Norwich, or that the money shall be paid when the jobber returns home. The business is hazardous, and now and then unfortunate; but the drover considers himself well paid, if, every expense of the journey being discharged, he clears from 2*s.* 6*d.* to 5*s.* per head; and when he has either money or credit sufficient to take a drove of 600 or 1000 head of cattle to the market, that is a good remunerating price." The drovers are said to be a respectable and deserving class of men. They are very different from the class who drive the cattle into Smithfield market from the outskirts of London, where they meet another class, the country drovers; but neither the one nor the other are anything more than mere *drivers* of the cattle to market. The 'drover,' properly so called, requires either capital or credit.

ON THE BLASTING OF ROCKS.

THE question whether or not the invention of gunpowder has increased or lessened the liability of the occurrence of war, is one which has been much contested; but it is at all events satisfactory to know that this formidable substance has been, and promises still further to be, a most powerful working agent in the hands of the civil engineer. The extensive operations now carrying on in the neighbourhood of Dover, where, by the agency of gunpowder, large masses of rock are being removed to prepare the way for the South-Eastern Railway, afford a remarkable exemplification of the process of blasting, which may deserve a brief explanation.

The blasting of rock by the aid of gunpowder is the substitution of a working agent which acts suddenly, for one which proceeds step by step. It is one grand effort, instead of a succession of efforts. It is a sudden disruption, whereby a mass of rock is detached, instead of being picked off piecemeal. The explosive or expansive force of gunpowder is the agent which effects this object; and much discussion has arisen respecting the precise mode in which this force is to be estimated. The explosion is considered as the extrication of a permanently elastic fluid by the ignition of the gunpowder, the elastic fluid or gas occupying nearly five hundred times as much space as the grains of gunpowder had done. Some scientific men have supposed that the nitre contains air between two and three hundred times denser than the free atmospheric air; and that this, in struggling for liberation, exerts a force equal to that of a thousand atmospheres: that is, that if the pressure of the atmosphere be taken at fifteen pounds in the square inch, the bursting force of ignited gunpowder is equal to nearly seven tons upon the square inch. Count Rumford even went so far as to estimate the bursting force as equal to ten thousand atmospheres, but this has been deemed extravagant. Be the amount what it may, however, the powerful mechanical force thus exerted is very evident, and could not long escape the notice of the civil engineer.

The purposes to which blasting by gunpowder would be likely to be applied in civil operations are, the detaching of the mineral riches in our mines and collieries, the excavation of tunnels, and the clearing away of cliffs and rocks for the formation of docks, harbours, quays, roads, railways, &c. In our mines immense quantities of gunpowder are annually used, for the purpose of blasting the coal and iron-stone, and thus saving the labour of the pickaxe. Brindley was the first to adopt the bold step of blasting a tunnel through a hill as a means of carrying a canal on a level, instead of making a detour round the hill, or ascending it by means of locks. In the year 1776 he completed the first navigable tunnel, at Harecastle in Staffordshire, which is upwards of a mile in length. Since that period many remarkable examples of tunnelling have been presented, in all of which, if the soil were hard and rocky, blasting by gunpowder has been the chief working agent. At Sopperton, on the canal joining the Thames with the Severn, there is a tunnel three miles in length, forced through the solid rock by means of gunpowder. In France, a tunnel

seven miles in length has been lately completed. In the famous Box Tunnel, on the Great Western Railway, the excavation through hard rock has been of almost unexampled magnitude, and has been executed with the aid of one hundred and thirty tons of gunpowder! In the structure of the Breakwater at Plymouth, the government purchased a hill or quarry of hard rock on the neighbouring shore, detached the rock in large masses by means of blasting, and constructed the breakwater with the masses thus procured. For the construction of the Royal Victualling Yard near Devonport, a recess or basin has been scooped out of solid rock by blasting, the rock furnishing a great part of the material for the structure, and the buildings occupying the place where the rock had before been. Between Folkstone and Dover, the South-Eastern Railway is to be carried along the very face of the cliffs, suspended as it were midway between land and sea; and to prepare the line of direction for this purpose, vast masses of jutting cliff are now being removed by blasting.

Such are a few instances to illustrate the kind of engineering operations in which blasting by gunpowder is available; and we may next briefly describe the mode in which the blasting is effected.

The object of blasting is generally not to shatter the rocky substance into a thousand pieces, but to detach it in a mass. In some cases, however, the utter disruption is desired. But whichever plan be adopted, the gunpowder is inserted in a hole bored in the rock itself, proportionate in size to the amount of effect to be produced. This hole is bored horizontally or obliquely, according to the depth of the strata of which the rock is composed, or to the position which the whole body of rock occupies. The hole may vary from half an inch to three or four inches in diameter, and from a few inches to seven or eight feet in length. The tools employed are few in number and simple in construction, and consist principally of augers and chisels of various diameters. The hole is produced chiefly by a kind of chisel called a 'jumper,' which (if the hole be small), is held in the left hand of the workman, and struck by a hammer or mallet held in the right, the jumper being moved about between the successive blows. If the hole is of large dimensions, one man guides the jumper, adjusting its position and moistening it with water, while another man strikes the blows with the hammer. Sometimes, instead of using a hammer, the men employ a very heavy jumper, much longer than the hole which they are about to bore; and, lifting this in and out of the hole, suffer it to perforate the rock by the weight and momentum of its descent.

When the hole has been bored to the proper depth, the *débris*, or broken rock, is scraped out, and the whole prepared for the reception of the powder. The hole being about half filled with powder, a long sharp instrument called a 'pricker' is thrust through it, as a means of forming a channel or recess for the reception of the 'priming.' Fragments of burnt clay, pounded brick, stone, and similar earthy matters, are then rammed into the hole on the top of the powder, the 'pricker' still remaining inserted in the centre. This ramming down of what may be termed the 'wadding' is the most dangerous part of the operation; for if there should be metallic particles enough present to produce a spark, an explosion would be very apt to follow. Many an eye and an arm has been lost by this cause.

When the powder has been firmly rammed in by the earthy matters laid on it, the 'pricker' is withdrawn, leaving a kind of tubular or conical space. The space is then filled with loose powder; or else a tube is made of wheaten or oaten straws, fitted end to end, filled with powder, and inserted in the cavity. By either of these means the powder is brought into connection with the external atmosphere, where it is placed in contact with a 'slow match,' consisting generally of a bit of soft paper, prepared by immersion in a solution of saltpetre. All is now ready. The workman applies fire to the paper, and immediately gives a signal for every one to run beyond the reach of danger, he doing so likewise. A minute or so elapses before the fire reaches the powder; but when it does, an explosion is heard, and the rock is rent asunder. If the charge of powder was too small, the rending is insufficient; if too large, the rock is not only dissevered, but is shattered into small fragments and scattered all around: the proper quantity of powder is therefore determined by experience.

Many improvements have been gradually introduced in the method of blasting; some of them highly curious in their nature. It used to be supposed that the blasting would not be effective unless the powder were rammed tightly down by strata of rock and earth above it; and hence numerous accidents which occurred to the workmen. But it is now found that dry loose sand, simply poured into the hole on the top of the gunpowder, will effect the end desired. A writer in the 'Encyclopædia Britannica' states that this method is now so much adopted, 'particularly at Lord Elgin's extensive mining operations at Charlestown in Scotland, where much attention is paid to the security and comfort of the artificer, as well as to everything interesting to science. The practice of using loose sand, instead of pounded stone rammed with force, has been in use several years,—it is believed, since about the year 1810." Sand was similarly used in the extensive quarrying operations which became necessary in cutting down a part of the Calton-hill, to form the new approach to the city of Edinburgh, where upwards of a hundred thousand cubic yards of rocky matter were removed, and one thousand pounds worth of gunpowder used in blasting.

But the most interesting circumstances connected with blasting are those which relate to the mode of ignition or kindling. Various contrivances, under the names of 'port-fire,' 'slow-match,' and 'fuzee,' have been applied to this purpose. The 'slow-match' is explained to be a piece of paper saturated with a liquid, which causes it to consume slowly or smoulder when ignited, instead of burning away at once. A 'port-fire' is a paper tube, filled with a composition of meal-powder, sulphur, and saltpetre, rammed moderately hard: it is a contrivance used to kindle the powder in a hollow cavity; but it is more adapted for the firing of guns and mortars than for blasting. A 'fuzee' or 'fuze' is a hollow tube of wood, filled with composition which has been rammed tightly down: it is inserted in a bomb-shell, which is not required to explode until a certain period after being shot from the mortar or piece; and therefore the composition is such as will burn slowly till it ignites the powder contained within the shell. Various modifications of these contrivances have been applied to the firing of gunpowder for blasting; but they bid fair to be superseded by one of a very remarkable and scientific character.

Among the effects which the passage of electricity produces, is one due to the existence of any obstruction to the free and unopposed transit. Those who are any way acquainted with the "galvanic battery" are aware the current therein excited will travel to any distance along a wire; and that if the wire be interrupted in its circuit at any part by a small interval, intense heat is excited, which may be made to ignite gunpowder or similar substances placed in the intervening space. It occurred to Colonel Pasley, to whom was consigned the office of raising the sunken 'Royal George' at Spit-

head, that a system of blasting analogous to that employed on land might be adopted to shatter the ill-fated ship; and that the powder, conveyed down into the water for this purpose, might be ignited by means of galvanic agency. The idea was a bold one, and the success has been signal. For months Colonel Pasley had to contend against great difficulties, in the construction of canisters or cylinders to contain the powder, in the means of preserving the powder from being wetted when the canisters were lowered into the sea, in the adjustment and fastening of the canisters to the sunken ship, in the connection of the wires of a voltaic battery with the gunpowder within the canisters, and in the firing of the charge without injury to those who had to superintend the operations at the surface of the water. These difficulties had to be overcome one by one; and the result has been the establishing of a system which seems likely to be extensively available both in land and sea operations. The galvanic batteries were on board a vessel on the surface of the water; and from the batteries wires descended through the water to the canisters (some of which contained three thousand pounds of gunpowder!), fastened to the exterior of the bottom of the ship. When the galvanic current was excited, it passed through the gunpowder contained in the canisters, ignited it, and caused an explosion which shattered the enormous hull of the sunken vessel to fragments. The statements which have appeared so abundantly in the newspapers, relating to the saving of guns, spars, fragments, &c. from the wreck, forms a sequel to these operations; for after the shattering of the wreck had been effected by the explosions, divers went down day after day for months together, fastened the dislodged guns and relics to chains depending from barges above, and gave signals whereby the articles were hauled up by the aid of capstans.

From that time, the use of the galvanic battery in igniting the gunpowder for blasting has attracted the attention of engineers. Very recently an explosion on an unexampled scale has taken place near the Shakspere Cliff at Dover; a million cubic yards of chalk-rock having been loosened and precipitated at one blast. Three pits or shafts were sunk, communicating with hollow chambers, in which eighteen thousand pounds of gunpowder were deposited. The wires of a galvanic battery were placed in connection with the powder, and the whole charge was fired at once. A great saving of expense will accrue to the company, by the sudden removal of a mass of rock which would otherwise have had to be removed by hand-labour, to form the line of railway.

Sheep in Mecklenburg.—The Saxon or Merino sheep, however, is the animal which bests remunerates the Mecklenburger, and forms the especial object of his care and attention. They were brought to these countries from Saxony, about the year 1811, and are now universal. The greatest pains are taken to produce fleeces as nearly equal as possible over the whole flock. The nature of this sort of sheep is so little known in England, although an object of such vital importance to the British Australian Colonies, that I venture to hope a description of it may be acceptable. The Merino is a long-legged, narrow-bodied, ugly animal, with a fleece varying in weight, in proportion to its coarseness (although fine wool is specifically heavier than coarse) from 2 lbs. to 3 lbs. The staple is very close and thick growing, greasy or oily to the feel, elastic and soft, very tenacious, and formed differently from any other wools, with a number of regular, minute bends, or curls, in each hair. There are always different sorts of wool upon the same sheep, and that animal is of course the most esteemed which produces the highest qualities in the greatest proportion. Breeding successfully with this view is a most difficult science, requiring years of painstaking intelligence to attain. I was present at the exhibition of 22 rams at the cattle-show of Güstrow in Mecklenburg, in May, 1837. The specimens to an inexperienced eye appeared much alike: they were carefully washed and shorn, the fleeces numbered and sent to the most eminent wool-staplers at Leipsic, where they were submitted to accurate assortment and valuation. The Merino is supposed to be indigenous to Spain, and known to have been first introduced into Germany in 1765 by the then Elector of Saxony. Shortly after (about 1775), another small flock was brought to Austria, and subsequently in 1786, and 1802, to the imperial domains of Holditch in Hungary, and Mannersdorf in Austria. From these small beginnings has this valuable animal been spread over these immense countries. But there are two distinct breeds, which differ materially in shape and the quality of their wool. 1st.—The Infantado, or Negretti, distinguishable by shorter legs and a stouter make; the head and neck generally short and broad, the nose short and turned up, and the body round like a barrel. The wool is often matted upon the neck, back, and thighs, and grows upon the head to the eyes, and upon the legs to the very feet. The grease in its fleece is almost pitchy, and as the dust becomes incorporated with it, the washing is a matter of difficulty and risk: the greatest care is at all times necessary in this operation. A warm mild day, without harsh or drying wind, is indispensable, and care must be taken never to rub the fleece with the hand. A marl-pit with a depth of from eight to ten feet of clear water is a favourite washing-place, and is thought to become better every year. The sheep are thrown in from a stage in the evening, and made to swim the whole length of the pond (twenty to thirty yards), between rails, with boards on one side, from which women or boys assist them through their bath, by placing wooden rakes or crooks under their chins, and so passing them onwards. When the water has dripped from the fleeces for an hour or two, the sheep are put into a house for the night, as close together as possible, in order to cause the greater evaporation, and the next day they are swum three or four times through the same pond, the last time the head being rubbed a little, and they are kept in the house (well supplied with clean straw), on dry food, for three or four days, until the wool, by sweating, as it is termed, has recovered its characteristic softness. The fleece of this species is generally thick, closely grown, and abundant. Ewes may average two and a quarter and even three and a quarter pounds by careful feeding (which, however, must never approach to feeding to be fat, else the wool becomes wiry and hard); and rams and wedders may bring four pounds, and even six pounds. This is the animal which came to Austria from Spain. The other distinct breed is the Saxon importation, and is called Escurial. Their shape differs markedly from the Infantados—longer legged, with a long spare neck and head, with very little wool on the latter: a finer, shorter, and softer character in its fleece, but deficient in quantity. One and a half to two pounds is frequently the amount from ewes, and two to three pounds from rams and wedders. On being presented to the Elector of Saxony in 1765, they received the appellation of Electorals. A great deal of trouble has been taken to combine the advantages of both breeds by crossing, but with doubtful advantages; and although the mixed breed has been found suitable for crossing with sheep not thorough-bred (called Mestizen), yet experience has shown that, to breed with advantage, all the rams, be the ewes what they may, should be either thorough-bred Infantados or Escurials, and that the same strain of blood should be persevered in: I know an instance where a large and valuable flock has been for years retrograding in consequence of *one* unsuitable ram having been introduced twelve or fourteen years ago. Good rams are of course becoming every year more attainable, but there are examples of breeders in Saxony who still obtain for distinguished rams as much as one hundred, two hundred, and even three hundred Louisd'ors (of nineteen shillings each).—*Communications of Mr. Carr to the Agricultural Journal.*

Conversation.—Whosoever hath his mind fraught with many thoughts, his wits and understanding do clarify and break up, in the communicating and discoursing with another; he tosseth his thoughts more easily; he marshalleth them more orderly; he seeth how they look when they are turned into words: finally, he waxeth wiser than himself; and that more by an hour's discourse than by a day's meditation. It was well said by Themistocles to the king of Persia, "That speech was like cloth of Arras, opened and put abroad; whereby the imagery doth appear in figure; whereas in thoughts they lie but as in packs."—*Lord Bacon's Essays.*

Yew-tree, at Fountains Abbey, Ripon, Yorkshire.]

THE YEW.

Some of the finest and most venerable yews are found in churchyards, and in many instances are coeval with the edifice around which they cast their solemn shade. Generations after generations have been borne to their last resting-place, and the brief memorials of their life have perished by the hand of time and forgetfulness, while the yew flourishes for hundreds of years afterwards. Like all the productions of nature destined for a protracted existence, its growth is slow; a century elapses before it reaches maturity. There is reason to believe that the fine old tree represented in the cut was planted before the Saxon period of our history was brought to a close by the Norman conquest. Fountains Abbey, where it still flourishes, was founded in 1132 by Thurston, Archbishop of York, for certain monks who separated themselves from the Benedictine Abbey of St. Mary's, York, in order to adopt the more austere discipline of St. Bernard. Burton, in his 'Monasticon,' gives the history of Fountains Abbey on the authority of a monk of Kirkstall, and we may briefly follow him, as it will be seen that our tree has some connection with his tradition:—"At Christmas, the Archbishop, being at Ripon, assigned to the monks some land in the patrimony of St. Peter, about three miles west of that place, for the erecting of a monastery. This spot of ground had never been inhabited, unless by wild beasts. The prior of St. Mary's, at York, was chosen abbot by the monks, being the first of this monastery of Fountains, with whom they withdrew into this uncouth desert, without any house to shelter them in that winter season, or provisions to subsist on, but entirely depending on Divine Providence. There stood a large elm-tree in the midst of the vale, on the lower branches of which they put some thatch and straw; and under that they lay, ate, and prayed, the bishop for a time supplying them with bread, and the rivulet with drink. Part of the day some spent in making wattles to erect a little oratory, whilst others cleared some ground to make a little garden. But it is supposed that they soon changed the shelter of their elm for that of seven yew-trees, growing on the declivity of the hill on the south side of the abbey, all standing at the present time (1685) except the largest, which was blown down about the middle of the last century. They stand so near each other as to form a cover almost equal to a thatched roof. Under these trees, we are told by tradition, the monks resided till they had built the monastery." What singular vicissitudes have taken place even under their shade! The abbey itself is now a ruin—perhaps the finest of the kind in England. Three centuries have passed away since its choirs and belfries were silenced; and yet a duration of four centuries from the building of the abbey to its dissolution is not a brief space, even in the history of a nation.

Of the yews at Fountains Abbey, the Seven Sisters as they were called, five still flourish, and may do so perhaps for many centuries to come; for even when the original trunk decays, the final ruin of the tree is not accomplished. This peculiarity of the yew is explained as follows by Mr. Loudon, in his 'Arboretum:'—"When the top of the trunk becomes cracked by the action of storms upon the boughs, the rain finds access, and in time causes decay; and the dead leaves and dung of bats and birds, &c. falling in, combine with the rotten wood to form a soft rich mould, into which a bud shooting out from a neighbouring part (if not actually covered with the mould) is naturally

drawn by the moisture and surrounding shade, and transformed into a root. As the fissure widened and deepened by the slow but sure progress of decay, this root would descend and thicken, till it ultimately fixed itself in the soil below. After a lapse of perhaps several centuries, decay, gradually advancing, would at last reach the circumference of the trunk, and produce a rift on one side; through this the rotten mould would fall out, gradually exposing the root it had conducted downwards, and the combined influence of light and air acting upon its juices would cause it to deposit annual layers of true wood, and to be covered with a true bark. Meanwhile it would have shot up a stem near its point of union, and have formed for itself an independent head and branches." In cases where this process takes place, the existence of a yew-tree on a particular spot might continue as long as the world endures.

The origin of the custom of planting yew-trees in churchyards is still a subject of considerable perplexity. As the yew was of such great importance in war and field-sports before the use of gunpowder was known, perhaps the parsons of parishes were required to see that the churchyard was capable of supplying bows to the males of each parish of proper age; but in this case we should scarcely have been left without some evidence on the matter. Others again state that the trees in question were intended solely to furnish branches for use on Palm Sunday, while many suppose that the yew was naturally selected for planting around churches on account of its emblematic character, as expressive of the solemnity of death, while from its perennial verdure and long duration it might be regarded as a type of immortality. Another origin has also been ascribed to the custom. In the works of a very ancient Welsh bard, two churches, the minster of Esgor and that of Hênllan, are spoken of as famous for the prodigious yew-trees which surrounded them. Hênllan signifies an old grove, and it has therefore been inferred that the church occupied the very site where the Druids had performed their rites before the introduction of Christianity into Britain. St. Augustine was enjoined by Gregory the Great not to destroy the pagan places of worship which he might find in this island, but to convert them into Christian churches; and if, as it has been suggested, the words kirk and church are derived from *cerrig*, a stone or circle of stones, it may possibly be correct to conclude that in some cases the first Christian churches in Britain were planted in the groves sacred to Druidical rites, and within the circular stone enclosures where the priests of this worship officiated. Dr. Stukely was of opinion that the round churches were the most ancient in England. From custom and taste, the planting of yew-trees in churchyards might easily be perpetuated from the pagan period, as we see in the present day, when the tree has ceased to be applicable to the objects for which it was once so much valued.

The use of the yew for making bows is noticed by the earliest Greek and Roman writers. Archery was the 'arm' for which England was most famous before the invention of gunpowder. Several of our old statutes forbid the exportation of yew, and its importation was enforced by several regulations, such as obliging foreigners to furnish ten bow-staves for every butt of wine which they brought to England. Other kinds of wood were also used for bows. Roger Ascham, who published his 'Toxophilus' in 1544, with a view to preserve or revive the manly old English weapon, says:—"As for brasell, elm, wych, and ashe, experience doth prove them to be mean for bowes; and so to conclude, ewe, of all other things, is that whereof perfite shootinge would have a bowe made." A preference seems to have been given to foreign yew when Ascham wrote. Mr. Loudon was informed, in 1837, by the principal bow-manufacturer in England, that the "common yew, with sufficiently clear and knobless trunks, is no longer to be found either in England or in any other part of Europe; and though," he said, "English yew is occasionally used by manufacturers, yet bows are now almost entirely made of different kinds of wood from South America." Ascham states that the best bows were made of the bole of the yew. "The bough," he says, "is knotty and full of pruines; the plant is quick enough of caste," but it was apt to break. Is not then the poet in error when he describes an ancient yew still existing as having perhaps furnished weapons to

> "Those that crossed the sea,
> And drew their sounding bows at Agincourt;
> Perhaps at earlier Cressy or Poictiers."

No European tree is so excellent for the cabinet-maker as the yew. It unites hardness with a close grain; is of a fine orange-red or deep brown colour, often beautifully veined, and is capable of receiving a high polish. The sap-wood, which forms only a small portion, is quite white, and also very hard. The yew is also admirable for many other purposes, for which it would be used if it were less scarce. Gilpin states that it was a saying in the New Forest, that a post of yew would outlast iron. When the yew-trees on Box Hill, Surrey, were cut down, about half a century ago, the half of one tree was sold for 50*l*., to be used in cabinet-work for inlaying. The yew makes an excellent and well-sheltered fence. For ornamental purposes, the trees selected should be females, as the berries which they bear add greatly to their beauty. They may be eaten with perfect safety; but the shoots and leaves are poisonous in many cases to some animals, whether in a green or dry state, while others eat them with impunity. When the Dutch style of gardening prevailed in this country, the yew was in great esteem, as it was more pliable under the shears than either box or juniper.

The dimensions of the tree in the cut are as follows:—height, fifty feet; girth at three feet from the ground, twenty-two feet eight inches; at five feet, twenty-six feet five inches. It is the largest of the now remaining five, and forms the end of the row. In the list of recorded trees of this species given in Mr. Loudon's 'Arboretum,' we find one mentioned still larger. It stands in Darley Dale churchyard, Derbyshire, and though the height is not greater, yet at the base the girth is twenty-seven feet; at two feet from the ground, twenty-seven feet seven inches; at four feet there are protuberances which swell the girth to thirty-one feet eight inches. The trunk is forked at seven feet from the base. The tallest yew-tree in England is in the churchyard of Arlington, near Hounslow, which is fifty-eight feet high. A famous yew at Ankerwyke, near Staines, is thirty-two feet five inches in girth at eight feet from the ground, and the diameter of its head is sixty-nine feet. At Tisbury, Dorsetshire, there is a yew whose circumference is thirty-seven feet: it is perfectly hollow, and a few years ago a party of seventeen persons breakfasted within its capacious bole. In many churchyards in Scotland and Wales, as well as in England, there are yew-trees of great antiquity. At Queenwood, near Tytherly, Wilts, there are some fine avenues of this tree. One avenue consists of one hundred and sixty-two trees, averaging a height of thirty feet, planted about two hundred years since. The other comprises one hundred and twenty trees, average height twenty-four feet, and it is believed they were planted about one hundred and seventy years ago. The usual growth of a seedling is six or eight feet in ten years, and about fifteen feet in twenty years.

PLANTS USED IN DYEING BROWN AND BLACK.

The materials used in dyeing, for the most part, derive their chief value in reference to their powers of producing the various shades and qualities of red, blue, and yellow; since the combination of different proportions of these three will produce an almost interminable series of other colours. There are, it is true, some ingredients employed which give a green dye, but for the most part the varied tints of green—whether known as sea-green, apple-green, grass-green, pea-green, or parrot-green—are produced by a double dyeing, first with blue and then with yellow, or first with yellow and then with blue. There are, however, substances specially employed in giving a black or a brown dye; and as we have in former numbers noticed the chief vegetable substances used in dyeing red, blue, and yellow, we will here mention a few calculated to give black or brown tints.

One of the most valuable substances employed to impart a black dye is *galls*, a remarkable tumour or excrescence growing on various trees. Sir J. E. Smith designates them as "morbid excrescences, originating from the most vigorously-growing parts of plants, in consequence of the attacks of insects, chiefly of the *hymenopterous* order, and of the genus *cynips*." The same authority describes the mode of formation, without reference to any particular kind of tree or gall, somewhat as follows:—The parent insect is provided with a sharp sting, serving to perforate the branch, leaf, or bud in which its egg is to be deposited; and in some cases the puncture made is very deep. As soon as the egg is hatched, the young larva, or maggot, stimulating the vital principle of the plant, causes the part in which it is lodged to assume a great degree of luxuriance, displayed in various extraordinary excrescences, foreign to the nature of the plant in itself, but each appropriated to the particular kind of insect from whose operations it springs. The original perforation is soon closed up and entirely obliterated. At length, the maggot having fed on the juices of the plant, copiously directed to the injured part, undergoes its changes to a chrysalis, and finally to a winged fly like its parent: it then escapes from its confinement by a fresh perforation, and the gall, being left empty, soon dries or hardens.

Such are briefly the steps in the formation of a "gall-nut." The oak is the tree which yields the main supply of galls. The light spongy bodies, growing on one of the English species of oak, and vulgarly termed "oak-apples," are galls; they grow from the stalks of the leaf or flower, or from the young twigs; and there is sometimes a red juicy berry-like excrescence, something like a cranberry, found on the leaves. The two kinds used principally in dyeing and ink-making are called the "common" and the "Aleppo" gall, the former being brought from the South of Europe, and the latter from Western Asia. The Aleppo gall-nut is a round body, of an olive-green colour: it is hard and heavy, and frequently exhibits small protuberances on its surface. When broken it is found to consist of four distinct parts, which admit of being separated. The external or cortical covering is of a close fibrous but thin texture, highly astringent to the taste. The part that immediately follows is very similar to resin, both in its fracture and lustre; its colour is dark yellowish-brown; it is very brittle, and its taste nauseously astringent and bitter; on a red-hot iron it becomes black, exhales a peculiar odour in great abundance, consumes without flame like the cortical covering, and leaves a little ash. It is bounded on the interior by a pale yellowish-brown shell, which has many of the properties of ligneous fibre. Lastly, this shell encloses, when the gall-nut is sound, an oval kernel, about a quarter of an inch in length, of a brownish cream colour, or sometimes of a bright chocolate: it is insipid unless chewed; but if chewed, a faint sweetish flavour is appreciated, like that of a bad almond.

The common gall-nut differs considerably from the preceding, and is easily distinguished. It is of a yellowish colour, not so heavy as the Aleppo gall, nor possessed of the same resinous fracture; it is also larger, being about the size of a nutmeg; less astringent, and not capable of making equally good infusions with water; on which latter account it is much less valued.

From very early times the gall-nuts of Syria have been esteemed for their excellence as a dye ingredient. They are shipped principally from Aleppo, Smyrna, and Tripoli; and hence in some respects have arisen their commercial names: but they are brought from the interior country. The finest quality of all are those obtained near Mosul, about ten days' journey from Aleppo, and thence conveyed to Aleppo for shipment to Europe. Other kinds nearly as good are found near the shores of the Tigris and Euphrates, still farther eastward. The inhabitants of Kurdistan have this trade chiefly in their own hands: they bring the gall-nuts from the interior country to the Levant ports during the winter months. The bluest specimens are the highest in price, and next to them those of a greenish colour; the whitest sort is the cheapest, a circumstance which has often led crafty dealers to dye white galls to give them greater apparent value.

Beckmann states, that in the oak-forests of Hungary, Moravia, Croatia, and Sclavonia the farmers and foresters used to notice excrescences growing on the trees; the men subsisted principally by the breeding of hogs in the forests; and they were wont to consider the frequent occurrence of these excrescences as a calamity, since, when they appeared in abundance, the crop of acorns, the food of the hogs, was observed to be considerably diminished. But they afterwards found that these excrescences, which they called "knoppern" or "knobben" (equivalent to the common English term "knobs"), were known and valued as a means of producing a black dye; and that the profits arising from the sale of this new article of trade far surpassed that derived from the acorns. In the year 1774 the inhabitants of these provinces obtained permission to export this article by sea to the Austrian harbours in the Mediterranean; and it thenceforth became an article of commerce.

As a substitute for gall-nuts the ancients frequently made use of acorn-cups; and indeed the latter are still used in Italy, from whence, in latter times, they have found their way into Germany and France. They are imported from the Greek islands and Smyrna. It is recorded that in 1779, when the supply of "knoppern" in the Austrian dominions temporarily failed, a merchant of Vienna caused upwards of twelve hundredweight of acorn-cups to be sent from Smyrna, which he sold with great advantage. These cups, and the acorns they contain, are very large; the former are about two inches in diameter, are woolly within, and furnished with woody scales on the external surface; the latter are about two inches long, and almost entirely enclosed by the cup, so that the top only is visible.

Gall-nuts, and the acorn-cups just alluded to, when pounded, yield an infusion which becomes the foundation of one of the most valuable black dyes, whether silk, woollen, cotton, or linen be the fabric under operation.

Another class of vegetable products useful in imparting black dye is the *bark* of several kinds of trees.

The bark of some trees, such as the *quercus* (oak), the *berberis* (barberry), and the *fraxinus* (ash), contain restringent or colouring particles useful in dyeing. The oak is a tree whose bark yields a very valuable infusion, both for dyeing and tanning. A description of the country-occupation of oak-bark peeling was given in one of our early volumes.

A variety of vegetable substances yield small quantities of black dye ingredient, useful in some of the modifications of dyeing, but not in the larger and more extensive processes. A black colour is obtained from the juice of the *cashew-nut*, which will not wash out, and even resists the process of boiling with soap or alkalies. The juice of a variety of the cashew found in the East Indies yields a dye having a brownish tinge. The juice of the common sloe might be made to yield a bluish-black dye; but the quantity of this plant available is too small to make its use important. Logwood, although most extensively employed in imparting a black dye to cloth, cannot so consistently be deemed a black as a red dye; for it gives the latter colour as a preparative for the action of other ingredients which give the black tinge; its principal effect is to give a lustre and beauty to black colours, which would otherwise appear what is often termed "rusty." The leaves of the *arbutus uva ursi* have been sometimes employed as a substitute for galls, in giving a pretty good black colour to cloth which has previously been dyed blue. Gall-nuts, however, used in conjunction with red oxide of iron, constitute the main and important agent in black dyeing.

Brown colours are in many cases imparted by a mixed application of black and red, different proportions of which will give a varied series of browns. But there is a class of colours called *fawns*, which constitute a brown not capable of being given by mixed black and red; such colours are largely used in dyeing, and they are generally produced by the action of some one substance, according to the tint. *Walnut-peels* form one of the most useful of these agents. These peels constitute the green covering of the nut; they are internally of a white colour, which is converted into brown or black by exposure to the air. The skin, when impregnated with the juice of walnut-peels, becomes of a brown or almost black colour, as any one may have noticed who has seen the peelers at work. If the decoction of walnut-peels be filtered and exposed to the air, its colour becomes of a deep brown; the pellicles in evaporation are almost black, and the liquor detached from these yields a brown extract, completely soluble in water. A copious precipitate, of a fawn colour, approaching to ash, is produced in a decoction of walnut-peels by means of a solution of tin, and the remaining liquor has a slightly yellow tinge.

The affinity of cloth for the colouring-matter of walnut-peels is said to be very strong, so that the dye is taken readily and is durable. In the latest edition of Berthollet's work on dyeing it is said—"When it is wished to dye with walnut-peels, they are boiled for a full quarter of an hour in a copper, in quantity proportionate to the amount of stuff, and to the depth of shade that is desired. For cloths, the deepest shades are usually begun with, finishing with the lighter ones; but for woollen yarn it is commonly the clearest shades that we begin with, and the deepest shades are made at the end, with the addition of husks for each parcel. . . . The root of walnut gives the same shades, but for this effect the quantity must be increased: it must be reduced to chips."

Sumach, the bark of the birch-tree, sandal-wood, and many other vegetable substances, are employed occasionally to give various tints of fawn, drab, or brown, according to the circumstances under which the operation is conducted, the material of the woven fabric, and the quality of the dye ingredient. But many of these have been already spoken of while treating of plants used in dyeing yellow; and the rest call for no particular remark.

Decadence of a State.—The temples of antiquity, the castles of the middle ages, are poetical in their decline, for the spirits that peopled them in the days of their splendour still wander through the cherished ruins; but what spirit would condescend to haunt the ruins of a rope-walk? Trade has no spirit, and sets none in movement: it knows of nothing but positive speculations, and sets nothing in movement but legs and arms; but let the wheel stop, and poverty, wretchedness, beggary, are the immediate consequences. Alas, to *be* poor is no greater hardship than to be rich, for our wants increase with our power of gratifying them; but to *become* poor, that is bitter, for it carries with it an involuntary feeling of a fall! How much more, then, when it is a *nation* that has become poor. Spain is not poor, they will tell me, for it possesses inexhaustible resources within its own soil; but of what worth are those resources to people who know not how to bring them into play? At the time of the Moors, Spain contained twenty millions of inhabitants;—some say thirty;—now it does not contain ten. The land was then rich and flourishing, and sufficed for all the wants of a luxurious population. Of course it must then have possessed resources, that became dormant in proportion as the population melted together. The land remains uncultivated because roads and canals are wanting for the conveyance of its produce. The plains of Castile grow the finest wheat in the world; and when grown it is given to the pigs, because the grower has no means of conveying it to a market. There is no trade but along the coast, and even there it is almost exclusively in the hands of smugglers. The land that once monopolized the trade of both the Indies, the land that could fit out the Invincible Armada for the conquest of England, possesses at present not a single man-of-war, and has no commerce but what is carried on by smugglers! —*Letters of the Countess Hahn-Hahn; from the Foreign Quarterly Review.*

Villages of the Warows, in British Guiana.—The *Mauritia* grow in clusters as thick as trees can grow; the Warow selects one of these groves, and fells the trees about four feet from the surface, on their stumps he lays a floor of the split trunks; the troolies are generally adjacent for the roof, but if not, the eta leaf serves; lumps of clay are laid on the floor, on which fires are made, which at night illuminate the tops of the adjacent trees, as if they were actually inhabited; but the habitation is an irregular hut, raised on a platform just above the level of the water, which in these regions is three feet above the earth for three-fourths of the year. Some of them can contain 150 people. Their duration is coeval with the supply of aroo (starch or arrow-root), or eta starch, or the completion of the formation of a corial or canoe. When an eta tree begins to fructify, it is cut down, a large slice is cut off one side, and the stringy substance of the interior is cut into shreds, the remainder of the trunk serving as a trough, in which it is triturated with water, by which is disengaged a considerable quantity of starch; the fibrous particles are then extracted, and the sediment or aroo formed into moulds like bricks. This is spread out, on stones or iron plates, over the fire, and makes a very nutritive, but at the same time most immasticable bread—it must be unavoidably bolted, being so very viscous that chewing absolutely locks the jaw: it is, nevertheless, excellent to thicken soup, and is a general specific for diarrhœas and dysenteries, which in these aquatic regions are the prevailing diseases. In the green part of the trunk, a beetle of about an inch and a half long, with a long snout, which lays its eggs, and in about a fortnight grubs, about the size of the two first joints of the forefinger, makes its appearance. These are a favourite fry both of the Warows and the creoles; they are scarcely distinguishable from beef marrow.—*Hillhouse's Memoir, in Geographical Journal*, vol. iv.

The difference between desultory reading and a course of study may be aptly illustrated by comparing the former to a number of mirrors set in a straight line, so that every one of them reflects a different object, and the latter to the same mirrors so skilfully arranged as to perpetuate one set of objects in an endless series of reflections.—*Guesses at Truth.*